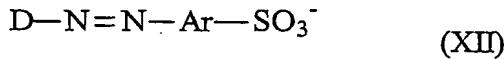


CLAIMS

1. A copolymer comprising (a) one or more pendant group segments and (b) one or more polyol segments, each of said segments being linked to one or more further 5 segments which may be the same or different,

wherein said one or more pendant group segments are the same or different and are selected from:

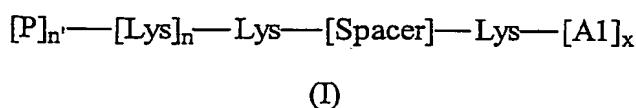
10 (i) siloxane segments;
(ii) segments containing phosphoryl choline or a derivative or analogue thereof;
(iii) segments containing a di- or trifluoromethyl group;
(iv) heparin-like segments containing a group of formula (XII)



15 wherein D is an aliphatic or aromatic group and Ar-SO₃⁻ comprises one or more linked aryl and/or heteroaryl groups, at least one of the aryl and/or heteroaryl groups having an SO₃⁻ substituent; and

(v) segments containing a group of formula (I)

20



wherein:

25 - [A1] is an inert amino acid;
- x is 0, 1, 2 or 3;
- [Spacer] is a fatty acid, amino acid, peptide or PEG;
- [P]_n-[Lys]_n is a dendritic structure formed from n lysine groups and terminating in n' groups P;

30 - n is an integer of from 1 to 15;
- n' is zero or an integer of up to 16; and

each P is the same or different and is an amino acid or a peptide having up to 25 amino acids,

and wherein at least a part of each of said pendant group segment(s) is on a side chain of the copolymer.

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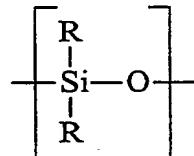
2. A copolymer according to claim 1, wherein the segments are linked via urea or urethane linkages.

3. A copolymer according to claim 1 or claim 2, comprising one or more

10 pendant siloxane segments.

4. A copolymer according to any one of the preceding claims, wherein the pendant siloxane segment(s) comprise a linear siloxane, said linear siloxane comprising repeating units of the formula (II)

15



(II)

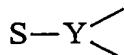
wherein each R is the same or different and represents an aliphatic or aromatic group.

20

5. A copolymer according to claim 4, wherein each R is the same or different and represents an alkyl, alkenyl, alkynyl, cycloalkyl or aryl group.

6. A copolymer according to any one of claims 1 to 3, wherein the pendant

25 siloxane segment(s) have the structure (III)



(III)

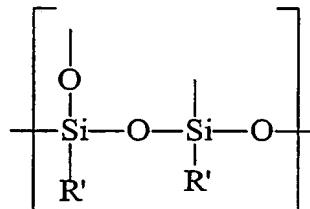
wherein S is a linear siloxane group, a silsesquioxane cage or a partial silsesquioxane cage and Y is an aliphatic group which is bonded to at least two urea or urethane linkages.

5

7. A copolymer according to claim 6, wherein S is a silsesquioxane cage.

8. A copolymer according to claim 7, wherein the silsesquioxane cage S consists of repeating units of formula (IV)

10



(IV)

wherein each R' is the same or different and represents an aliphatic or aromatic group and wherein one R' group is replaced with a bond attached to group Y.

15

9. A copolymer according to claim 8, wherein each R' is the same or different and represents an alkyl, alkenyl, alkynyl, cycloalkyl or aryl group.

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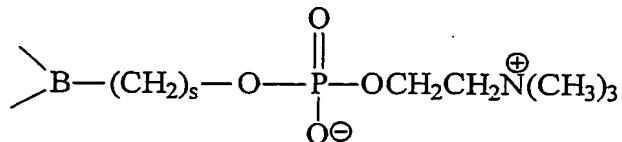
10. A copolymer according to any one of the preceding claims which comprises one or more pendant siloxane segments, and wherein the ratio of siloxane segment(s) to polyol segment(s) is 1:10 or less.

11. A copolymer according to any one of the preceding claims, which comprises one or more pendant siloxane segments having a molecular weight of up to 5000.

25

12. A copolymer according to any one of the preceding claims, which comprises two or more different pendant siloxane segments, each containing a silsesquioxane cage or partial cage.

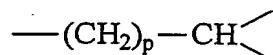
13. A copolymer according to any one of the preceding claims, wherein the segment(s) containing phosphoryl choline or a derivative thereof have the formula (V)



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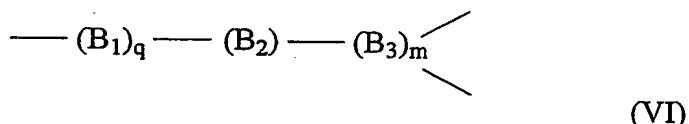
(V)

wherein s is 0, 1, 2, 3 or 4 and B is an aliphatic group of formula

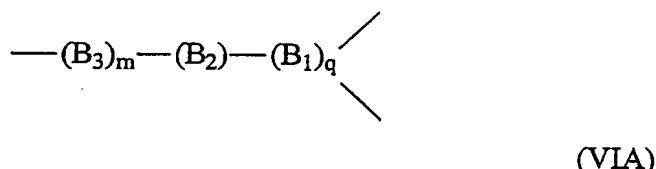


wherein p is an integer of from 0 to 8, or B is a group of formula (VI) or (VIA)

10



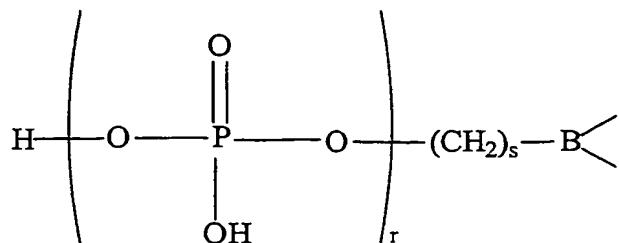
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wherein each B_1 is the same or different and is a $\text{C}_6\text{-C}_{10}$ aryl, a $\text{C}_1\text{-C}_8$ alkylene, $\text{C}_2\text{-C}_8$ alkenylene, $\text{C}_3\text{-C}_6$ cycloalkyl group or a 5- or 6- membered heterocyclyl group containing 1, 2 or 3 heteroatoms selected from nitrogen, oxygen and sulfur; B_2 is a 5- to 10-membered heterocyclyl or heteroaryl group containing from 1 to 5 heteroatoms selected from nitrogen, oxygen and sulfur; B_3 is an aliphatic group; q is 0, 1, 2 or 3; and m is 0 or 1.

14. A copolymer according to any one of the preceding claims, wherein the segment(s) containing an analogue of phosphoryl choline have the formula (VII)

25



(VII)

wherein s and B are as defined in claim 13 and r is 1, 2, 3, 4 or 5, and wherein the
 5 one or more phosphate groups are, independently optionally present in the form of a
 salt.

- 15. A copolymer according to any one of the preceding claims, wherein the segment(s) containing a di- or trifluoromethyl group are straight or branched, C₂₋₁₂ alkylene groups which are substituted with one or more di- or trifluoromethyl groups and optionally one or more fluorine atoms.
- 16. A copolymer according to any one of the preceding claims wherein the segments(s) containing a di- or trifluoromethyl group are siloxane segments, segments containing phosphoryl choline or a derivative or analogue thereof, heparin-like segments or segments of formula (I) which are substituted with a di- or trifluoromethyl group.
- 17. A copolymer according to any one of the preceding claims, wherein in the group of formula (XII) Ar comprises one or two linked aryl or heteroaryl groups selected from phenyl and pyrazolyl, Ar being substituted with one or two -SO₃⁻ groups and one, two or three further substituents selected from methyl, ethyl, methoxy, methylthio, nitro and dimethylamino groups; and D is a group D¹-D²-D³- wherein D¹ is an aryl or heteroaryl group which is unsubstituted or substituted with one, two or three substituents selected from methyl, ethyl and methoxy groups, D² is -NR'CO-, -CONR', -OCO-, -COO-, -NR'SO₂- or -SO₂NR'- and D³ is phenyl or a C₁₋₄ alkylene or C₂₋₄ alkenylene group which is unsubstituted or substituted with one, two or three substituents selected from methyl, ethyl and methoxy groups.

18. A copolymer according to any one of the preceding claims, wherein the group of formula (XII) is a derivative of an Acid Yellow compound.

5 19. A copolymer according to any one of the preceding claims wherein, in the group of formula (I), n is 7.

20. A copolymer according to any one of the preceding claims, wherein, in the group of formula (I), P is an amino acid or peptide in the D-form.

10

21. A copolymer according to any one of the preceding claims which comprises two or more different pendant group segments.

15 22. A copolymer according to any one of the preceding claims, further comprising (c) one or more chain extender segments, each of said chain extender segments being linked to one or more further segments, which may be the same or different.

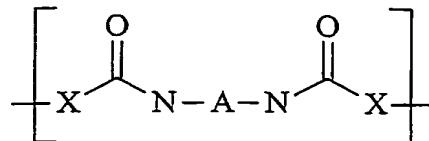
20 23. A copolymer according to claim 22, wherein said chain extender segment(s) are selected from amino acids, peptides, polypeptides and C₁-C₆ aliphatic moieties.

24. A copolymer according to claim 23, wherein one or more of said chain extender segment(s) is an anticoagulant.

25 25. A copolymer according to claim 23 or 24, wherein one or more of said chain extender segment(s) is RGD (Arg-Gly-Asp).

26. A copolymer according to any one of the preceding claims, wherein each segment is linked to one or more further segments by a group of formula

30



wherein each X is the same or different and is a nitrogen or oxygen atom and each A is the same or different and is an aromatic or aliphatic moiety.

5

27. A copolymer according to any one of the preceding claims, which comprises as component (b) one or more polycarbonate segment(s).

10 28. A process for producing a copolymer according to any one of claims 2 to 27, which process comprises polymerising, in any order,

(i) one or more pendant group segments as defined in any one of claims 1 to 19, the or each segment being bonded to at least one group selected from primary or secondary amine, hydroxyl and carboxylic acid groups;

15

(ii) a polyol;

(iii) an aromatic compound having two or more isocyanate groups; and optionally

20

(iv) one or more chain extenders selected from amino acids, peptides, polypeptides and C₁-C₆ aliphatic groups, each of which has at least one substituent selected from primary or secondary amine, hydroxyl and carboxylic acid groups.

25

29. A process for producing a copolymer according to any one of claims 2 to 27, said copolymer comprising as the pendant group segment a linear siloxane attached directly to the backbone of the copolymer,

which process comprises (i) reacting a polyol polyurethane with a strong

base, and (ii) reacting the product of (i) with a siloxane.

30. A copolymer obtained or obtainable by the process of claim 28 or 29.

5 31. A process for producing a lined copolymer, which process comprises seeding cells onto the surface of a copolymer as claimed in any one of claims 1 to 27 or 30.

32. A lined copolymer obtained or obtainable by the process of claim 31.

10 33. A moulded article comprising a copolymer as claimed in any one of claims 1 to 27 or 30 or a lined copolymer as claimed in claim 29.

34. A moulded article according to claim 33 which is an implantable device.

15 35. An implantable device according to claim 34 which is a vascular graft.

36. A method of treating a human or animal patient in need of the replacement of a body part, said method comprising replacing said body part with the implantable device of claim 34 or 35.

20

37. Use of a copolymer according to any one of claims 1 to 27 or 30 in the manufacture of an implantable device for the replacement of a body part.